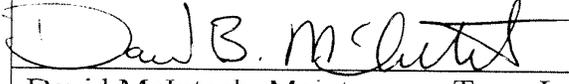
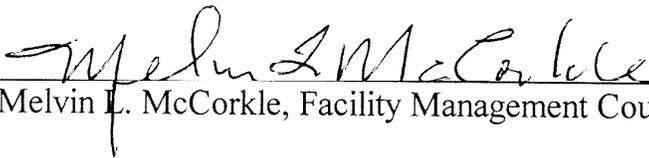


CRITERION 605

ROLL-UP/OVERHEAD DOORS

SIGNATURES

			
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ROLL-UP/OVERHEAD DOORS

1.0 PURPOSE

It is the intent of this document to establish the minimum requirements and best practices for the operation and maintenance program for LANL Roll-up/Overhead Doors.

This document addresses the requirements of LIR 230-05-01.0, "Operations and Maintenance Manual."

2.0 SCOPE

The scope of this Criterion includes all LANL facility and programmatic roll-up/overhead doors, with the exception of fire doors. The Operation and Maintenance criterion for Fire Doors is in Section 700 Criterion series and is the responsibility of the LANL Fire Marshal. Maintenance of the drive motors for doors with operators is obtainable in Criterion 510, "Electric Motors." LANL is responsible for approximately 350 electric and 150 manual overhead doors that require maintenance and repair in order to provide safe access to the structures they serve.

3.0 ACRONYMS AND DEFINITIONS

3.1 Acronyms

CFR	Code of Federal Regulations
CMMS	Computerized Maintenance Management System
JCNNM	Johnson Controls of Northern New Mexico
PMI	Preventive Maintenance Instruction
PP&PE	Personal Property and Programmatic Equipment
RP&IE	Real Property and Installed Equipment
SSC	Structures, Systems and Components
UC	University of California

3.2 Definitions

Chain Hoist Assembly: This is a manually driven mechanism that is attached to the shaft of the door assembly and provides a method for opening and closing non-electric roll-up/overhead doors. (Overhead Door Company, Reference 10.3)

Door Cycle: Positioning of the door from closed to open and then closed again.

Electric Operator: These devices are mechanisms that include an electric motor, gear reducers and drive links that open and close overhead and roll-up doors. (Overhead Door Company, Reference 10.3)

Emergency Release: This release is a manual lever that allows an overhead door to be opened and closed manually. This device is a standard requirement for electric-powered overhead doors. It is utilized during emergencies such as electrical power outages, flooding conditions and equipment failures. (Overhead Door Company, Reference 10.3)

ML1 and ML2: Management Levels. Refer to LIR 230-01-02.2 for definition of these terms.

Overhead Door: A type of large opening door that consists of separate horizontal panels that are hinged together to form a complete door enclosure. This configuration of panels is also known as a sectional door. Either an electric motor or a manual chain hoist that drives a geared mechanism operates them. (Overhead Door Company, Reference 10.3)

Roll-up Door: These devices are doors that consist of separate horizontal thin panels that are fastened together and can be rolled up into a housing above the door opening. Either an electric motor or a manual chain hoist drives a geared mechanism for operation. (Overhead Door Company, Reference 10.3)

Track: Tracks are steel structures that guide the moving rollers attached to the door section or panels. These tracks are solidly mounted to the adjacent structure that outlines the opening for overhead doors. (Overhead Door Company, Reference 10.3)

4.0 RESPONSIBILITIES

4.1 FWO-SEM

4.1.1 Responsible for the technical content of this Criterion and assessing the proper implementation across the Laboratory. FWO-SEM shall also provide technical assistance in support of implementation of this Criterion.

4.2 Facility Manager

4.2.1 Responsible for operations and maintenance of institutional, or Real Property and Installed Equipment (RP&IE), in accordance with the requirements of this document.

4.2.2 Responsible for operations and maintenance of those Personal Property and Programmatic Equipment (PP&PE) systems and equipment addressed by this document which may be assigned to the FM in accordance with the FMU-specific Facility/Tenant Agreement.

- 4.2.3** Responsible for system performance analysis and subsequent replacement or refurbishment of RP&IE and assigned PP&PE based on sound Life Cycle Analysis techniques and system-specific performance requirements.

4.3 Group Leader

- 4.3.1** Responsible for implementing operational and maintenance surveillance programs including the preparation and maintenance of required procedures and documentation for PP&PE under their jurisdiction that is covered by this Criterion.

5.0 PRECAUTIONS AND LIMITATIONS

5.1 Precautions

This section is not intended to identify all applicable precautions necessary for implementation of this Criterion (e.g. lock-out/tag-out, confined space entry, PPE, etc.). It is intended only to assist the user in the identification of hazards/precautions that may not be immediately obvious.

- 5.1.1** Do not operate a manual overhead door having damage to the door and/or track and requires any degree of additional effort to completely open or close. Have the unit repaired.
- 5.1.2** Do not operate an electric powered door where the controls are not labeled properly. Confusion with equipment operating switches can cause unanticipated system failures and potentially result in serious injury or property damage.
- 5.1.3** Do not stand under or near any overhead door during its activation. Notify personnel in the area to stand clear when operating doors. Reference 10.6, Lessons Learned ID 1997-007-WS: Roll-Up Door Safety Awareness.
- 5.1.4** Do not use the electric operator to power OPEN or CLOSE a poorly operating or damaged door.
- 5.1.5** Do not attempt to wind, unwind or otherwise tamper with a torsion spring counterbalance. Contact a qualified service person. Repairs and adjustments to torsion springs should be made by a trained service person using proper tools and instructions.
- 5.1.6** Unplug electric operator or turn circuit breaker OFF before making any adjustments to limit switches or driving mechanisms. Use LANL lockout, tag-out procedures.
- 5.1.7** Maintenance and inspection of the subject doors often requires work at elevations greater than six feet. In these situations, a Safety professional should review the work scene before the work is started.

5.2 Limitations

The intent of this Criterion is to identify the minimum generic requirements and recommendations for SSC operation and maintenance across the Laboratory. Each user is responsible for the identification and implementation of additional facility specific requirements and recommendations based on their authorization basis and unique systems, equipment and conditions, (e.g., equipment history, manufacturer warranties, operating environment, vendor O&M requirements and guidance, uniform codes, etc). Nuclear facilities and moderate-to-high hazard non-nuclear facilities will typically have additional facility specific requirements beyond those presented in this Criterion which are contained in their Authorization Basis (e.g., Safety Analysis Report, Technical Safety Requirements, or Facility Safety Plans), etc. as applicable.

Note that nuclear facilities are also required to implement the requirements of DOE Order 4330.4B, Chapter II (Reference 10.14) (or 10 CFR 830.340, Maintenance Management, when issued) as the minimum programmatic requirements for a maintenance program. Additional requirements and recommendations for SSC operation and maintenance may be necessary to fully comply with the current Order or Code of Federal Regulations identified above.

6.0 REQUIREMENTS

Minimum requirements that Criterion users must follow are specified in this section. Requested variances to these requirements must be prepared and submitted to FWO-SEM in accordance with LIR301-00-02.3, "Exceptions or Variances to Laboratory Operations Requirements" (Reference 10.1) for review and approval. Unless otherwise noted, users should apply a graded approach to determine the frequency for maintenance evolutions based on normal usage and impact to the mission and safety of the facility.

6.1 Operations Requirements

6.1.1 Inspect the floor area directly under the door and on the sides for tripping hazards that may create hazards to personnel. Inspect the areas affected by the operation of the door for obstructions that may interfere with normal operation of the door. These inspections should be performed every time the door is opened or closed. (Appendix A)

NOTE: Documentation supporting execution of this requirement may be required for ML1 and ML2 door systems or as defined in a facility Authorization Basis. As a minimum, personnel that operate roll-up / overhead doors must be able to demonstrate knowledge of this requirement.

Basis: These inspections are required to assure personnel safety and are based, in part, on DOE Lessons Learned ALO-LA-FIRNGHELAB-1995-0002 (Reference 10.7).
Wear of obsolete floor guides and other surrounding structures may become damaged

and cause personnel injuries. Obstructions that may interfere with the normal operation of the door may cause personnel injury or damage to the door.

6.2 Maintenance Requirements

6.2.1 Semi-Annual Intervals

Unless otherwise noted, users should apply a graded approach to determine the frequency for maintenance evolutions based on normal usage and impact to the mission and safety of the facility.

6.2.1.1 Visually inspect critical welds between the curtain or panel support shaft and end-plates for damage or cracking.

Basis: This inspection is required to assure personnel safety and is based on DOE Lessons Learned ALO-LS-LANL-PHYSCOMPLX-1997-0003 (Reference 10.8). Damaged welds can lead to failure and allow the door to fall uncontrollably. Several DOE locations have experienced near-miss accidents that could have been prevented by performing this inspection.

6.2.1.2 Inspect labels on the door control switches. Verify that the labels provide clear guidance for the operation of the door and cannot be confused with other equipment in close proximity to the operating door such as a dock leveler.

Basis: This inspection is required to assure personnel safety and is based on Lessons Learned 1998-LA-LANL-ESH7-0009 (Reference 10.5) and vendor instruction, i.e., Overhead Door Company; Recommended Preventive Maintenance - Rolling Doors 1994 (Reference 10.3).

7.0 RECOMMENDATIONS AND GOOD PRACTICES

The information provided in this Section is recommended based on acceptable industry practices and should be implemented by each user based on their unique application and operating history of the subject systems/equipment.

7.1 Operations Recommendations

7.1.1 Operate in accordance with manufacturer's guidelines.

7.1.2 New roll-up doors should have critical welds inspected for flaws prior to installation and operation.

7.2 Maintenance Recommendations

7.2.1 Semi-Annual Intervals

Unless otherwise noted, users should apply a graded approach to determine the frequency for maintenance evolutions based on normal usage and impact to the mission and safety of the facility.

7.2.1.1 Visually inspect cables and wire rope clamps for damage or deterioration that can cause potential failure of the cable.

Basis: This inspection is recommended to assure personnel safety and is based on DOE Lessons Learned NVOO-EGGO-NLVO-1994-0002 (Reference 10.12) and Lessons Learned RL-PNNL-PNNLBOPER-1996-0021 (Reference 10.13). Breaking or separation of the cables or clamps can cause the door to free-fall in an uncontrollable fashion. Several DOE locations have experienced near-miss accidents that could have been prevented by performing this inspection.

7.2.1.2 Visually inspect the slats, sections and panels, especially near the top of the door, for deformation of the interlocking grooves.

Basis: This inspection is recommended to assure personnel safety and is based on Lessons Learned ALO-LA-LANL-WASTEMGT-1997-0001 (Reference 10.11). Distortion of these grooves can cause serious failure of the door assembly. Several DOE locations have experienced near-miss accidents that could have been prevented by performing this inspection.

7.2.1.3 Perform the following maintenance tasks for sectional, panel, slated, and curtain door drive and track mechanisms:

- A. Visually inspect the operating chain for loose or worn cotter pins in the master link.
- B. Visually inspect the door guide for missing or broken pieces that can cause the door to hang up during operation.
- C. Verify that the track surface is free of oil and grease.
- D. Check the tightness of track bolts to angles and fasteners for snugness.
- E. Visually inspect the alignment of the door to insure proper operation
- F. Disconnect operator and operate door manually to check for smooth operation.
- G. Lubricate and inspect door rollers, hinge points and bearings.
- H. On the chain hoist assembly, inspect the chain and the drive wheels for excessive wear and damage. Lubricate the chain hoist.
- I. Verify that the emergency release mechanism is functional.

Basis: These tasks are based on LANL O&M experience, vendor instructions (e.g., Reference 10.3), and DOE Lessons Learned, i.e., Item E - NVOO-REEC-EHDO-

1992-0002 (Reference 10.9), and Item F - ALO-LA-LANL-SHOPSFAC-1997-0001 (Reference 10.10).

7.2.1.4 Perform the following maintenance tasks for all electrical operators:

- A. Check button station controls for proper function.
- B. Visually inspect wiring and conduit for damage and corrosion.
- C. Check and test limit and proximity switches for proper function; adjust if necessary.
- D. Visually inspect and lubricate roller chain.
- E. Check the roller chain for excessive looseness or over-tension.
- F. Inspect and test the brake; adjust if necessary.
- G. Verify that the motor mounting structure is secure.
- H. On operators so equipped, lubricate drive link limit switch shaft threads.
- I. Lubricate all non-sealed bearings.

Basis: These tasks are based on LANL O&M experience and vendor instructions (e.g., Reference 10.3).

7.2.1.5 Perform the following maintenance tasks for all door panels and associated hardware:

- A. Inspect and adjust the roller assembly holder as necessary.
- B. Check all hardware fasteners for tightness.
- C. Visually inspect bottom seal of door assembly for damage and replace as necessary.
- D. Inspect the door bottom safety edge device for proper function.

Basis: These tasks are based on LANL O&M experience and vendor instructions (e.g., Reference 10.3).

7.2.1.6 Perform the following maintenance tasks for counterbalances:

- A. Check drum and collar set screws for tightness and corrosion or slippage.
- B. Visually inspect the tension wheel (drum) and shaft for excessive wear and/friction damage.

Basis: These tasks are based on DOE Lessons Learned ID1995-SR-WSRC-LL-0003 (Reference 10.4).

7.2.2 Annual Intervals

Unless otherwise noted, users should apply a graded approach to determine the frequency for maintenance evolutions based on normal usage and impact to the mission and safety of the facility.

7.2.2.1 In addition to the 6 month maintenance, perform the following tasks for sectional, panel, slated, and curtain door drive and track mechanisms:

- A. Visually inspect torsion and tension spring fasteners for secure mounting.
- B. Visually inspect the ends of tension springs for wear or damage.
- C. Verify that safety cables are installed and secure on tension spring applications.
- D. Visually inspect weather-strip for wear or damage.
- E. Visually inspect door section assembly for proper side clearance and level and levelness.

Basis: These tasks are based on LANL O&M experience and vendor instructions (e.g., Reference 10.3).

7.2.2.2 In addition to the 6 month maintenance, perform the following tasks for electric operators:

- A. Visually inspect and adjust or replace the belts as necessary.
- B. Visually inspect and test clutch assembly; adjust if necessary.
- C. Visually inspect for physical damage and functionally test electrical disconnects.
- D. Inspect and check tightness of all sprockets.
- E. Check the gear reducer assembly for oil leakage and oil level. Repair and refill as required.
- F. Verify that all electrical panel covers are installed and secure.
- G. Verify that the proper fuses and circuit breakers are installed.
- H. Visually check the integrity of all wiring terminations for looseness or signs of excessive heat. Additionally, a scan with an Infrared instrument can be very useful in this inspection.

Basis: These tasks are based on LANL O&M experience and vendor instructions (e.g., Reference 10.3).

7.2.2.3 In addition to the 6 month maintenance, perform the following tasks for counterbalances:

- A. Lubricate spring attachment points.
- B. Visually check for track damage.
- C. Inspect locks for proper operation.
- D. Lubricate shaft bearings and torsion spring attachment points.

Basis: These tasks are based on LANL O&M experience and vendor instructions (e.g., Reference 10.3).

8.0 GUIDANCE

8.1 Operations Guidance

8.1.1 No guidance available.

8.2 Maintenance Guidance

The listed documents contain past and current procedures for performing maintenance on equipment included in this Criterion.

- 8.2.1** Provided it has been reviewed and approved by FWO-SEM, an acceptable program for overhead door maintenance may be found in JCNNM Preventive Maintenance Instruction (PMI) Number 40-25-009, "Roll-up & Overhead Door Equipment Maintenance and Repair" (Reference 10.2).

9.0 DOCUMENTATION

- 9.1** "As-found" data from inspection, testing and maintenance should be recorded and controlled in equipment history files, e.g., CMMS. The recorded equipment history information should be suitable to support maintenance activities, upgrade maintenance programs, optimize equipment performance, and improve equipment reliability.

Basis: This is a good maintenance practice that is recommended by DOE Order 4330.4B (Reference 10.14, Chapter 1, Section 3.4.9).

10.0 REFERENCES

The following references, and associated revisions, were used in the development of this document. Facility specific O&M procedures written to the requirements of this criterion should use the latest, LANL approved, revision of these documents.

- 10.1** LIR301-00-02.3, Exceptions or Variances to Laboratory Operations Requirements. April 28, 2000.
- 10.2** JCNNM PMI Number 40-25-009, "Roll-up & Overhead Door Equipment Maintenance and Repair." Rev. 0, Dated May, 1996.
- 10.3** Overhead Door Company Recommended Preventive Maintenance- Roll-up Doors 1994.
- 10.4** Lessons Learned ID1995-SR-WSRC-LL-0003: Roll-Up Door Component Falls at Savannah River.
- 10.5** Lessons Learned ID 1998-LA-LANL-ESH7-0009: Employee Pinned Against Dock When Incorrect Equipment Switch Operated.
- 10.6** Lessons Learned ID 1997-007-WS: Roll-Up Door Safety Awareness.
- 10.7** Lessons Learned ALO-LA-FIRNGHELAB-1995-0002: Employee Injured by Fall Caused by Tripping on Protruding Edge of Metal Cover in Rolling Door Track.
- 10.8** Lessons Learned ALO-LS-LANL-PHYSCOMPLX-1997-0003: Roll-up Door Fell to Closed Position in an Uncontrolled Fashion.

- 10.9** Lessons Learned NVOO-REEC-EHDO-1992-0002: Overhead Door Fell Due to Cotter Pin Failure in Gear Chain.
- 10.10** Lessons Learned ALO-LA-LANL-SHOPSFAC-1997-0001: Electric Drive for Rollup Door Failed.
- 10.11** Lessons Learned ALO-LA-LANL-WASTEMGT-1997-0001: Roll-up Door Separated From Top Slat And Fell To The Floor.
- 10.12** Lessons Learned NVOO-EGGO-NLVO-1994-0002: Roll-up Door Failure.
- 10.13** Lessons Learned RL-PNNL-PNNLBOPER-1996-0021: Roll-up Door Fails at the PDLW Facility Resulting in Safety Concern.
- 10.14** DOE Order 4330.4B. Maintenance Management Program, February 10, 1994.
- 10.15** DOE O 430.1A. Life Cycle Asset Management Order. Attachment 2: Contractors Requirements Document, Page 14, 10-14-98.

11.0 APPENDICES

Appendix A: Warning Notice for Overhead Door Operators

APPENDIX A

WARNING NOTICE FOR OVERHEAD DOOR OPERATORS

CAUTION

Keep Clear of Personnel
and
Equipment/Materials